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Gogebic Iron Range, Michigan: [specimens] 7460-7606. No. 23 July + August, 1884

Van Hise, Charles Richard, 1857-1918
[s.l.]: [s.n.], July + August, 1884

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U. S. GEOLOGICAL SURVEY

FIELD NOTE BOOK

No. 23

July & August. 1884

Gogebic Iron Range.
Mich.

7460 7606

C. R. Vanhise.

Survey of the Pre-Cambrian Rocks of the N. W. States.

INSTRUCTIONS.

1. Devote at least two pages of this note book to one section. On the left hand page place a map of as much of the section as has *actually been seen*. Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and figure attached, showing the amount and inclination of the dip. Denote slaty or other very plainly bedded rocks by lines running in the direction of the strike, with figures and a dip arrow attached as before. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the smaller spaces as 100 paces, each of the spaces between the red lines as 500 paces, and four of these large spaces as one mile, or 2,000 paces. Usually the southeast corner will be placed at the first red line above the bottom of the page and at the right hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up or down one space, or the map may be turned around and the north placed at the left hand side of the page.

2. On the right hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, after which give in order the position of the ledges as reckoned in paces from the southeast corner of the section, and the dip and strike when observable, for instance: 4025; 250 N., 300 W.; *Strike*, N. 6° E.; *Dip*, 50° E. Then follow with as full a description of the exposure as possible. Very often the notes for one section will cover more than one page in which case pass to the next right hand page, *repeating the map on each left hand page* as long as the notes, with regard to one section, continue.

3. Collect a specimen from each separate ledge of rock, or whenever there is a change of rock on any one ledge. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be sampled, the position and extent of the ledge being marked on the map, with the note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples will be allowed, but in all other cases *large sized trimmed specimens*, with chips for slicing, must be selected in accordance with § 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. All specimens are to have numbers painted on them, in white on a black background, in camp.

4. On the last twenty-five pages of the book give, as may seem desirable, a general account of the examination of the region mapped in the previous pages, correlation of observations, etc., etc.

5. Forward this note book, as soon as filled, as registered mail matter, to R. D. IRVING, U. S. Geologist, Madison, Wisconsin.

#23

Sec. 5/5 T. 14

R.

✓ 7461
X
20

7462
X
20

7463 X 15

7466

7464

X 15
20

Thursday July 27 1884

7460. Greenstone (1000 S. 500 W.
of the N.E. corner of sec. 11. T47
R44. This range was seen
to run continuously a half
mile west of the above lo-
cation

7461. Greenstone (northern trap)
1335 E. of the N.W. corner of
Sec. 15, T47, R44,

7462. Greenstone (northern trap)
576 E of the N.W. corner of
Sec. 15, T47 R44. The
specimens 7461-2 are from
the northern side of the
range and the exposure is
continuous from one to the
other.

7463. Fine grained dark gray
slaty gneiss ^{also mica} ~~dark~~ ^{green} horn
blende. 600 S. of the N.W. cor-
ner of Sec. 15, T47 R44.

7464. Greenstone. 725-2. of 1/4 post
between Secs. 15 & 16 T47 R44,
northern face of ridge
which runs to this point
from the location of 7460

Sec: 11+14

T.

47
19

R. 44

* 7471

*

*

*

*

11

*

*

* 7470

* 7469

Sg 30
30 7468
ag 7465-6-7
40

*

Greenstone. Loc 7464. 9502
of 1/4 post between Secs 15 & 16.

At 5002. of the S. W. corner
of Sec. 14, T 47 R 44, there
is a very large exposure,
which from this point runs
north and south, of slate or
"Greenstone" conglomerate
like that previously described
(7447)

At 5002. 140 N. of the S. W. cor-
ner of Sec. 14, T 47 R 44, there
is a still larger exposure of
the conglomerate above spoken
of, in which the matrix is
more coarse, and the quartz
pebbles consequently com-
pose more of the rock. Here
the strike is W. 30° S., and
the dip 40° S. Erection is for the
S. W. corner. The southern
face is 60 paces long, the western
30, and the northern 100. The
strike and dip of this ex-
posure, as above determined, may
be quite far from the rock
truth; for the rock is so
massive and cut by joints
that it is with the greatest

difficulty that any places are found where anything can be determined of strike or dip in this "greenstone" or greywacke conglomerate.

7465 Pieces of the sparse matrix of this conglomerate.

7466 Pieces of quartzite pebbles, which compose the body of the rock, showing in one place the rounded surface of the pebble which comes from the above matrix.

7467 Fragment showing weathered surface of some of the pebbles where the pebbles are small. They sometimes reach the size of boulders a foot in diameter.

7468 Greywacke slate. Western exposure 500E. 290P. of the S. W. corner of Sec. 14 T47R44. Strike W. 35° S. dip 60° S. This is taken to be a phase of the rock 7465-6-7 composed entirely of the finer materials, to the exclusion of pebbles.

7469. ^{Greywacke} Quartzite - like 7463 - containing very little of the soft greenish

(9-891.)

Sec. 516 & 17 T. 47

R. 44

11

schist which characterizes the conglomerates heretofore described. 500 E. 450 N. of the S. W. corner of Sec. 14, T. 47, R. 44.

Marzite, like 7469, 545 E. 600 N. of the S. W. corner of Sec. 14.

7470

^{Pyroxene} Marzite, like 7469, at 500 E. 600 N. of the S. W. corner of Sec. 14, T. 47, R. 44.

Marzite like 7469 - 7 is also found in large exposures at the following points on the line run, and was seen at numerous places not located both to the right and left of this line - fewer being shown toward the west upon account of the Purgan Dale River Valley.

500 E. 660 N., 500 E. 800 N.,
500 E. 970 N., 600 E. 1200 N.,
600 E. 1400 N., 600 E. 1500 N.,
of the S. W. corner of Sec. 14
T. 47 R. 44.

7471.

Greenstone (northern trap)
High southern and western ex-
posure. 50 E. 75 N. of $1\frac{1}{4}$ mile
between Secs. 14 & 11, T. 47 R. 44.

Sec. 2 2+15 T. 47

R. 44

22

7472 ~~20~~

5

(2) There is a continuous face of the Conglomerate (7447) from 200 S. 200 E. of S. W. corner of Sec. 14, T47 R44, to 100 S. 100 W. of the same corner.

Friday, July 25, 1884.
Greenstone, like 7460, 100 W. 100 S. of the 1/4 post between Secs. 16 + 17 T47, R. 44. The greenstone ridge from which 7460-4 are taken is continuous westward to the above location.

7472 Greenstone. 1000 E. 200 N. of the S. W. corner of Sec. 22 T47, R. 44.

7473. Gray druse. Low knob at 490 N. of the S. E. corner of Sec. 20 T47, R. 44.

7474. Fine grained quartz Schist. ^{or gneiss} North-
ern exposure 660 N. 75 W. of the S. E. corner of Sec. 20, T47, R. 44.

7475 Greenstone. 275 N. of 1/4 post between Secs. 20 + 21, T47, R. 44.

Greenstone, like 7475. 235 N. of same 1/4 post.

Sec. 20 + 21 T. 47

R. 44

21

*7475⁶er
*er

Sc, #7474

also, #7473

20

20

Sc, #7474

also, #7473

C. 7474

7476 Chloritic Quartz Schist. 300 N.
 of 44 pps between Secs. 20+21, 77, 44.

7477. Two phases of high greenstone
 bluff. which extends from
 800 E. 230 S. of the N.W. corner
 Sec. 17 T. 47 R. 44, to 800 E.
 380 S. of the same place.

7478. Felsite dyke cutting the above
 greenstone in an east and
 west direction almost verti-
 cally. dyke 18" across.

7479. Contact specimen of 7477 and
 7478.

7480. Felsite dyke cutting greenstone
 7477 in a north and south
 direction with a western
 dip.

At 800 E. 600 S. of the N.W.
 corner of Sec. 17 T. 47 R. 44,
 the magnetic attraction is
 90° degrees, The needle point-
 ing due west.

Secs 17+18 T. 47

R. 44

N

~~7472~~ ~~7473~~ ~~7474~~

7472
7473 752
60
25.2
11802
11002

7481 400

7477 8.
7478 7.P.
7479
7478 7.P.

← mg. AL.

18

17

20
110
7480
7481
7482
7483
7484
7485
7486
7487
7488
7489
7490
7491
7492
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7494
7495
7496
7497
7498
7499
7500

X

Saturday, July 26, 1884.
 7481. Greenstone (Northern trap)
 southern exposure at 695
 ft of 14 foot between Secs.
 17 and 18 T. 47, R. 44.

Greenstone like 7481, 800 W.
 of the N. E. corner of Sec 18
 T. 47 R. 44.

Same Greenstone at 400 W.
 and 600 W. of the N. E. corner 18.

570 steps west of the N. E.
 corner of Sec. 18 T. 47 R. 44.
 there is a magnetic attraction
 of 10° E.
 At 700 E. mag. at. 10° E.

7482. Banded ferruginous quartz-
 schist. High southern in-
 cline. Exposure made by test
 pit at 700 W. 138 S. of the N. E.
 corner of Sec. 18 T. 47 R. 44.
 Strike E + W. dip 50 to 60
 N. mag. attraction 250 E.

7483. ~~Greenstone~~ Quartzite from test pit
 700 W. 130 S. of the N. E.
 corner of Sec. 18 T. 47 R. 44

At the following points magnetic attractions were taken. The distances are from the the N.E. corner of Sec. 18, T. 47, R. 44.

700 W.	1905.	Magn. Str.	23° E.
700 W.	2235.	" "	23° E.
700 W.	2905.	" "	23° E.
700 W.	3705.	" "	18° E.
700 W.	4805.	" "	10° E.

7484 Greenstone (northern trap) 4
 140 N. of S. W. corner of Sec. 7,
 T. 47, R. 44

7485 Siliceous limestone (travertine)
 East end of on east and west
 ridge, 4505. 300 W. of 1/4 post
 between Secs. 17 and 18, T.
 47, R. 44. Strike W. 10° S. dip
 80° N. Mostly closely banded,
 and siliceous, sometimes mas-
 sive. Contains in places
 of stratification many
 numerous gray veins two to
 three inches in thickness.
 The weathered surface shows
 the characteristic appear-
 ance of limestone, the more
 calcareous portions of the
 rock dissolving the fastest.

Sec. 39 + 8 T. 47

R. 74

20

19

cls. 7487 7487 7450

- Sunday, July 27 1884.
7486. Limestone (Marble). From northern exposure 430 S. of $\frac{1}{4}$ post between Secs. 17 & 18 S. 47 R. 44. Contains veins of calcite, but no veins of quartz, although it is continuous with 7485.
- 7487 Limestone Mica Schist. Low southern exposure 435 S. of $\frac{1}{4}$ post between Secs. 19 & 20. S. 47 R. 44
- 7488 Mica Schist. Eastern exposure 435 S. 75 W. of $\frac{1}{4}$ post between Secs. 19 & 20.
- 7489 Mica Schist. Northern exposure. 100 N. of $\frac{1}{4}$ post between Secs. 29 & 30. 747 R. 44. South side of exposure 75 W. Strike E. 23° S. dip 50° to 65° S.
- 7490 Mica Schist. Southern exposure. 600 N. of the S. W. corner of Sec. 18 T. 47 R. 44
- 7491 Mica Schist. From north side of same exposure as 7490. 700 N. of S. W. corner of section

Secs 29 + 30 T. 47

R. 44

29

25 -
7489 d. s. c.
50 + 53 -

30

Strike E 25° S. dip 30° in 600 S.
Above determinations rough.

Mica Schist, like 7491, 700 N.
200 N. of $\frac{1}{2}$ 44 post Sec. 13 47.40.

Mica Schist, like 7491, 100 N
of above.

7492. Greenstone (northern trap)
West end of bluff 515 N. of
the S. E. corner of Sec. 11 of
T. 47. R. 45.

7493. Greenstone (northern trap)
515 N. 600 N. of the S. E. cor-
ner of Sec. 11, T. 47. R. 45.
From this point, walking
upon the top of the green-
stone ridge, the northern
border of it being about
170 steps to the south the
bare rock was noticed at
grapping at the following
places, distances being given
from the S. E. corner of Sec. 11.
600 N. 850 N.
800 N. 1380 N.
800 N. 1624 N.
At this point the greenstone
ridge bore to the north.

Sec. 5 7+18 T. 47

R. 44

¹⁰
7484

18

7491
7490 250.
57 164

Travelling south on the section
line between 10 + 11, magnetic
attractions were noted on the
following points the distances
being in steps south of the
1/4 post between Secs. 10 + 11 &
47 R 45.

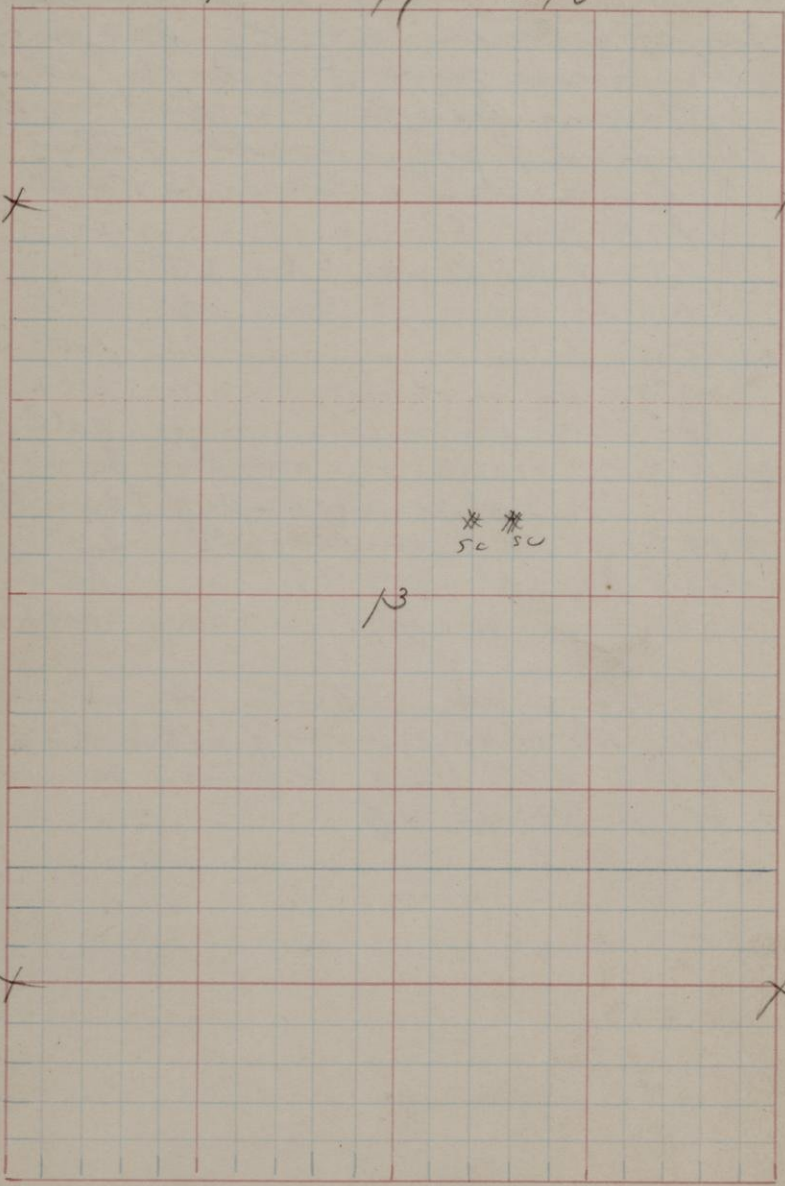
50 S. of 1/4 post	No attraction
150 S. " " "	Mag. Attr 10° E
175 S. " " "	" " 130 E.
225 S. " " "	" " 23° E.
260 S. " " "	" " 23° E.
315 S. " " "	needle points
	S. 23° W. instead of North.
400 S. of 1/4 post	Mag. Attr. 20° E.
450 S. " " "	" " 13° E.
530 S. " " "	" " 10° E.

7494. Ferruginous Schist. From test
pit on above line of attractions
330 S. of 1/4 post between Secs 10 +
11, T 47 R 45.

Sec. 13

T. 47

R. 45



Monday, July 28, 1884.
 7495. Fine Mica Schist and
 coarse quartz mica schist,
 interlaminated with each
 other. From north side of
 high hill 200 feet high
 300 ft. N. of the S. E. corner of
 Sec. 10 T. 47, R. 45

7496 Mica Schist and interstrat-
 ified quartzite. From east
 side of the hill from which
 7495 is taken. 140 ft. N. of the
 S. E. corner of Sec. 10 T. 47, R. 45.
 Strike E + W. Dip 75° N.

Mica Schist. Southernmost
 exposure of hill from which
 7495-6 are taken is at the
 S. E. corner of Sec 10 T. 47, R. 45.

7497 Mica Schist. Northern ex-
 posure 25 steps S. of $\frac{1}{4}$ post
 between Secs. 14 & 15 T. 47, R. 45.

Mica Schist, like 7497, from
 south side of hill from which
 7497 is taken 75 ft. S. of $\frac{1}{4}$ post
 between Secs. 14 & 15 T. 47, R. 45.

Secs 10411 T. 47

R.

7492

11

↑ 0

↑ 10e

↑ 23E

525W

7. 50. 523 W
7494

7494

7202

↑

f 102

SC ~~7~~ 7495

SC 7498

~~SL *~~

7498 Mica Schist. Northern exposure. 925 S. of the N. W. corner of Sec. 23, T47 R. 45. Strike 210° S. dip 60° S.

Mica Schist, like 7498, 130 S of $\frac{1}{4}$ post between Secs. 22+23 T47 R45 -
Same rock 200 S of $\frac{1}{4}$ post.

7499 Mica Schist. Southern exposure 150 W. 85 N. of the S. E. corner of Sec. 23 T47 R. 45. Strike 20° W. dip 60° S.

7500 Mica Schist. Southern exposure. 830 S. of $\frac{1}{4}$ post between Secs. 23+24 T. 47 R. 45 -

Mica Schist, like last, 400 N. 50 W. of the S. E. corner of Sec. 14 T47 R45. High. Northern exposure. Strike 210° S. dip 67° S.

Mica Schist, like 7495-6, at south side of hill from which they were taken. 100 W. of the S. E. corner of Sec. 10 T. 47, R. 45.

Sec. 14-15 T. 47

R. 45

SC 467

14

SC 7497

N

11.56
10.15
1.41

M. 2 7038 * 7509 2.

15

X

- 7501 Red Clay slate. From same hill as 7495-6 at 160 W. of the S. E. corner of Sec 10, T. 47, R. 45. Strike E 12° S. dip 65° N.
- 7502 Red Clay slate from same hill 177 W. of the S. E. corner of Sec 10.
- 7503 White Siliceous slate interstratified with 7502. Six feet north of it across the strike.
- Red Clay slate, like 7501, 20 feet north of 7503 across the strike.
- 7504 Red quartzite + Red quartz Schist interstratified. 450 W. 15 S. of the S. E. corner of Sec 10, T. 47, R. 45. Strike E 10° S; dip 30° N.
- Red Clay slate, like 7502. 470 W. 20 N. of the S. E. corner of Sec. 10. All the above slate and schist are ^{clear} ~~refined~~ able into thin layers of large size in the direction of bedding.
- 7505 Sandstones. From hanging wall of silver test pit. 750 W. of S. E. corner of Sec. 10, T. 47, R. 45.

Sec. 23

T. 47

R. 43

24

X

2 3

22

X

SC $\frac{10}{60}$ 7498SC *
SC *

23

SC # 7500

SC $\frac{10}{60}$ 7499 X

X

7506. Jasper Conglomerate. From foot wall of cone pis. at feet across the strike from 7505. Strike of layers of pis $E + N$. dip $30^\circ + 60^\circ N$. The flint pebbles in the conglomerate are much larger than in the specimen, they being a little farther south several inches in diameter. The variation of the sandstone to the conglomerate takes place in a distance of two feet across the strike. That the change is a variation rather than an abrupt alteration is shown by the fact that the each piece of rock is found in the other after it has become the prevailing one.

7507. Vitreous Quartzite. Southern exposure. 15-80 ft. south of the pis from which 7505 & 6 are taken. Strike and dip conform to those of the layers of the pis.

7508. Micaceous Quartzite. South-eastern exposure $50^\circ E$. 1265.

of the N.W. corner of Sec. 14, T. 47, R. 45.

7509. Vitreous Quartzite. Southern exposure 100 S. 110 E. of the N.W. corner of Sec. 14, T. 47, R. 45. Strike E + W. dip 60° N.

7510 Test pit 755, 110 E. of the N.W. corner of 14 sec. 25 N. of the above quartzite, contains the rocks in the same relative position and of the same kinds as the test pit 750 W. from which 7505-6 are taken. Besides the phases of rock there found this test pit contains a peculiar phase of quartzite 7510, not found in test pit 750 W.

7511 Jasper. From test pit 755. 66 E. of the N.W. corner of Sec. 14, T. 47, R. 45. This is the only coal of rock here uncovered.

Jasper. From test pit like 7511, 75 S. 43 E. of the N.W. corner of Sec. 14, T. 47, R. 45.

Sec. 3849

T. 47

R. 45

8. 10. 10.
x x x
x x x

9.
x x

10.
x x

9

6. 15. 22-

x 9. 10.
x 10.

8

7512. Friday, July 29, 1884.
 Jasper & Leean Ore, from
 trap pit. 570 ft. 127E. of
 1/4 post between Secs. 10 & 15 of
 T. 47, R. 43.
7513. Quartzite, from high east
 and west bluff. North-
 ern exposure. 420 ft. 127E.
 of 1/4 post between Secs. 10 & 15, T. 47, R. 43.
- Trap pit 600 ft. 48 W. of 1/4 post
 between Secs. 10 & 15, T. 47, R. 43.
 contains the same material
 like 7512.
7514. Greenstone (northern trap)
 southern exposure of bold
 bluff 100 feet high. 723-
 ft. of 1/4 post between Secs.
 10 & 15, T. 47, R. 43.
7515. Jasper and rich ore from
 pit. 270 ft. 530E. of 1/4
 post between Secs. 9 & 10
 T. 47, R. 43. Body of rich ore
 said to be 17 feet thick.
- Pit 2325. 530E. of 1/4 post
 contains Jasper and lean
 ore

Pit 2105. 5302. Contains mostly
lean ore and Jasper. One belt
2 feet thick of rich ore.

Pit 1855. 5302. Contains ma-
terials like last. Pit also contains

7516 Jasper Conglomerate. From
Pit 1855. 5302 of $\frac{1}{4}$ post be-
tween Secs 9 & 10 T. 47. R. 45.

Pit 1355. 5302 of same $\frac{1}{4}$ post
struck junction of "trap" and
Jasper ore - according to sink-
er.

7517. Greenstone (northern trap)
1355. 5302. From pit.

Pit 2405. 1002. Contains Jas-
per & lean ore.

Pit 2405. 902. of $\frac{1}{4}$ post
between Secs. 9 & 10 T. 47. R. 45.
Contains Jasper, and is said
to have 16 feet of clean soft ore.

Greenstone (northern trap)
4 post 800 ft. of last test pit.

Greenstone is again found

1665. of $\frac{1}{4}$ post between sec.
9+10 of 747 R 45.

7578. From 1935. of $\frac{1}{4}$ post between
sec. 9+10. 747 R 45 to 830S.
there is a trench which gives
a continuous view of Jasper
and lean ore. The strike is
E. 10° S. dip 60° to 70° N.

From pit 240S. 902. of $\frac{1}{4}$ post
between sec. 9+10. 747 R 45 to
223S. 80W. there is a large
number of pits. Most of them
show Jaspery lean ore, but
in one or two places rich
soft ore are found.

First pit showing rich soft
ore 260S. 340 W. of $\frac{1}{4}$ post be-
tween sec. 9+10. 747 R 45.

First pit showing some quality
of ore 250S. 890 W of $\frac{1}{4}$ post.

First pit containing Jasper and
lean ore 230S. 400 W of $\frac{1}{4}$ post.
The last three total pits
are in low swampy ground
a short way east of Sunday
Lake.

Sec. 8 15 41 6 T. 47 R. 45

N
X

d. sec. ^{Sec.} 70 19

18

15

N 85 0, 70 20
70
75 21
X

7519. Mica Schist. Eastern exposure
 5455. 25 W. of the N.E.
 corner of Sec. 16 T47 R43.

Mica Schist, like 7519, 3008.
 302. of the N.W. corner of Sec.
 15. T47 R43.

7520 Hornblende Mica Schist. North
 ern exposure at hill 100 feet high
 7505. of $\frac{1}{4}$ post between Secs 15 & 16
 T47, R. 43. The section line
 running south from this point
 is on a continuous high ridge
 showing numerous exposures
 of the above rock to 2405.
 of the N.E. corner of Sec. 21
 T47 R. 43 where the ground
 becomes low. Strike of rocks
 here nearly east and west.
 dip about 60° S.

7521 Hornblende Mica Schist
 Western exposure of above ridge
 25 N. of the S.E. corner of Sec.
 16 T47 R. 43.

Sec. 21+22 T. 47

R. 45

22

21

X

≡ N150.
≡
≡
≡ N150

X

Wednesday, July 30, 1884.
 Test pits containing lean ore
 and jasper 255, 265 E and
 708, 265 E. of $\frac{1}{4}$ post between
 Secs. 8+9, T. 47, R. 43. Mater-
 ials exactly like 7512.

7522. Greenstone (northern trap)
 southern exposure 150 N. 265
 E. of $\frac{1}{4}$ post between Secs. 8+9.

Magnetic attraction 250 W.
 of $\frac{1}{4}$ post between Secs. 8+9.
 No sun to measure.

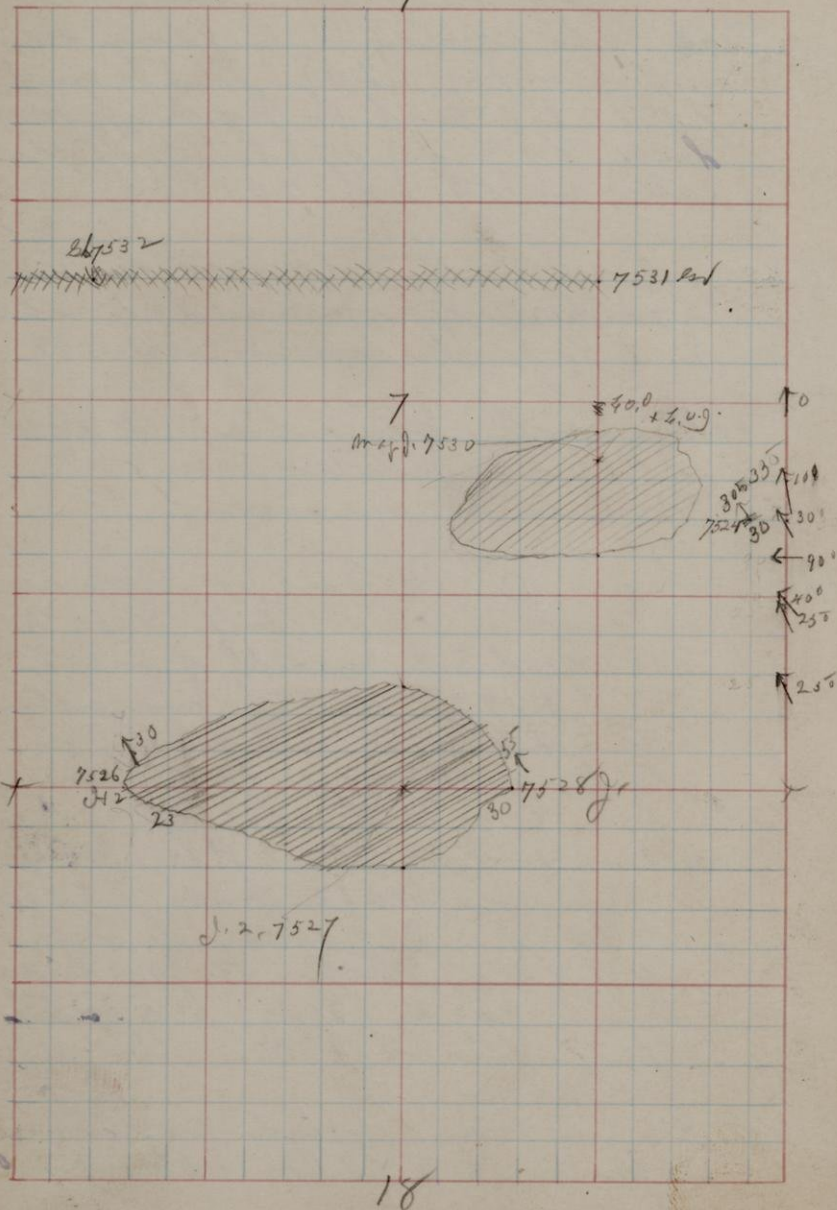
7523. Lean Ore + Jasper. Exposure
 at east end of bluff 700 N.
 818 W. of S.E. corner of Sec. 7.
 T. 47 R. 43. Strong magnetic
 attraction and no sun; so
 strike could not be taken.

7524. Lean Jaspery Ore. Bare Western
 exposure 40 ft. high. 700 N.
 100 W. of S.E. corner of Sec. 7.
 T. 47, R. 43. Strike W. 30° S. dip
 from 30° to 40° N. Magnetic
 attraction 40° W.

7525. Greenstone. High southern
 exposure 230 N. 40 E. of

Sec. 34 + 18 T. 47

R. 45



S. W. corner of Sec. 8. T47R45.

7526. Jasper. From western end of bluff 2702. of the S. W. corner of Sec. 7 T47R45. Strike W. 23° S. dip 30° N. Running east along the line there is a rapid rise from this point with numerous exposures both north and south of the line of the same jaspery quartz. At the following points exposures were noted on the line 5002. & 8382. of the S. W. corner of Sec. 7. At the latter point the rock becomes

7527 Coarse Jasper. At the $\frac{1}{4}$ post between 7 & 18 the hill is 150 feet high, and extends 200 paces south of this point and 260 north. This hill extends east of the $\frac{1}{4}$ post

7528 Jasper. 2652. of $\frac{1}{4}$ post between Sec. 7 & 18 T47R45. Strike E. 30° S. dip 30° N. Nowhere along the E & W. line between Secs. 7 & 18. is there any magnetic attraction.

Sec. 8 ✓

T. 47¹₈

R. 45

7525

BSC 7529
18
V80

17

7529. Marble Mica Schist.
Northern exposure. 300 S. of
1/4 post between Secs. 17 + 18
T. 47 R. 43. Strike W 10° N. dip
80° S. The rock is rather
massive and the above de-
terminations may be quite
far from the truth. The
south side of this hill is
40 steps farther south.

Thursday, July 31, 1884.
Running north from the
S.E. corner of Sec. 7, T. 47, R. 45.
the magnetic attractions are
as follows.

380	N.	Mag. Az.	25° W.
440	N.	" "	20° W.
475	N.	" "	25° W.
500	N.	" "	40° W.
600	N.	" "	90° W.
650	N.	(nearing easternmost of the three hills of the mag- netic range) Mag. Az.	
690	N.	(at S.E. corner of hill) Mag. Az.	
800	N.	" "	30° W.
1000	N.	" "	10° W.
1000	N.	(at $\frac{1}{4}$ post)	0

From this point running
west 500 paces there are no
attractions; thence running
south, foot of middle hill
is reached at 925 N. 500 W.
of S. 2. corner of Sec. 7, T. 47, R. 45.

Az 840 N. 500 W. (near north
side of top of hill) Mag. Az. 180°
Az 800 N. 500 W. (at south edge
of top of bluff at its west end)
the Mag. Az. is 20° E.
Hill (middle one) 100 feet high.

East end of bluff from which
7524 is taken is 700 N. of the
S.E. corner of Sec. 7, T. 47, R. 43.
Material like 7524.

7530 Magnetic Jasper. 840 N. 500 W.
of the S.E. corner of Sec. 7.
Grath edge of middle hill.

Test pit containing lean ore
and Jasper 950 N. 350 W. of
the S.E. corner of Sec. 7, T. 47, R. 43.

French exposing lean ore and
Jasper from 875 N. to 900 N.
500 W. of the S.E. corner of Sec.
7, T. 47, R. 43.

Valley between magnetic range
and trap 500 W. of line be-
tween Secs 7 & 8, T. 47, R. 43. - in
150 feet deep, reckoning from
top of magnetic range.

7531 Greenstone (northern trap)
300 N. 500 W. of 1/4 post be-
tween Secs. 7 & 8, T. 47, R. 43.
Running west from this
point, we travel over
a continuous ridge of
greenstone, with sporadic

Secs 12+13 T. 47

R. 46

5. 7589-40-1-2-8
 7582₁
 75372₁

12

65-
 cb 7535-
 2130 7534 7536

7.2. 7533
 5

13

to the right and left of the line, to the range line between 45 and 46.

7532 Greenstone (northern trap)
1800 W. 800 N. of $\frac{1}{4}$ post between Secs. 7 & 8. T. 47 R. 46.

7533 Ferruginous Quartzite. Large & some in the bed and along the banks of Black River. 250 N. of $\frac{1}{4}$ post between Secs. 12 & 13, T. 47 R. 46. Strike W 50 S. dip 5-70 N. No attraction. This & some continues in the bed of the river to 850 N.

7534 Ferruginous Quartzite. Large & some in bed of Black River 500 N. 75 W. of $\frac{1}{4}$ post between Secs. 12 & 13, T. 47 R. 46. Strike E. 20 S. dip 65 N. Magnetic attraction 15° E. From this point the & some is continuous to four foot fall. Down to the latter point from 7533 the layers are perfectly uniform and straight.

7535. Prevailing rock at Four
Four Falls on Black River.
535 N. 50 W. of $\frac{1}{4}$ post be-
tween Secs. 12 & 13. T. 47 R. 46
Strike 2 20° S. dip 65 N.
Magnetic attraction 13° E.
The strike and dip are taken
20 feet above the falls; for
at and below the falls the rocks
are massive and contorted.
- 7536 Peculiar phases of rock interstrat-
ified with 7535 at Four
Four Falls.
- 7537 Vitreous Quartzite exposure
in bed of Black River 1250
N. of $\frac{1}{4}$ post between Secs.
12 & 13. T. 47 R. 46. Strike E.
15° S. dip 75° N. From this point
the exposure is continuous
north 100 paces.
7538. Quartzite, from north end
of exposure 7537. Here the
strike is 2 + W. the dip 75° N.
At this point there is a
break in the rock exposure
when it becomes
7539. Fine Compacted Greenstone

carrying calcite in amygdalae.
Six feet farther north the
rock becomes

7540 Greenstone (compact) and
ten feet farther north the
rock changes to

7541 Greenstone (northern trap)

Fifty feet north of the
granite there is a knob
of greenstone in the bed of
the river ^{2.5 feet high} (the exposure is
continuous from 7539 to
this point) which carries
fragments of jasper and jas-
pery iron ore. These sub-
stances are found in the
greenstone in the most
irregular manner, as if
the greenstone when em-
bedded had passed through
a bed of jasper and jaspery
ore and had caught fragments
of these materials in the
fluid greenstone.

7542. Greenstone, represents the
prevailing phase of the
mass of the above knob.

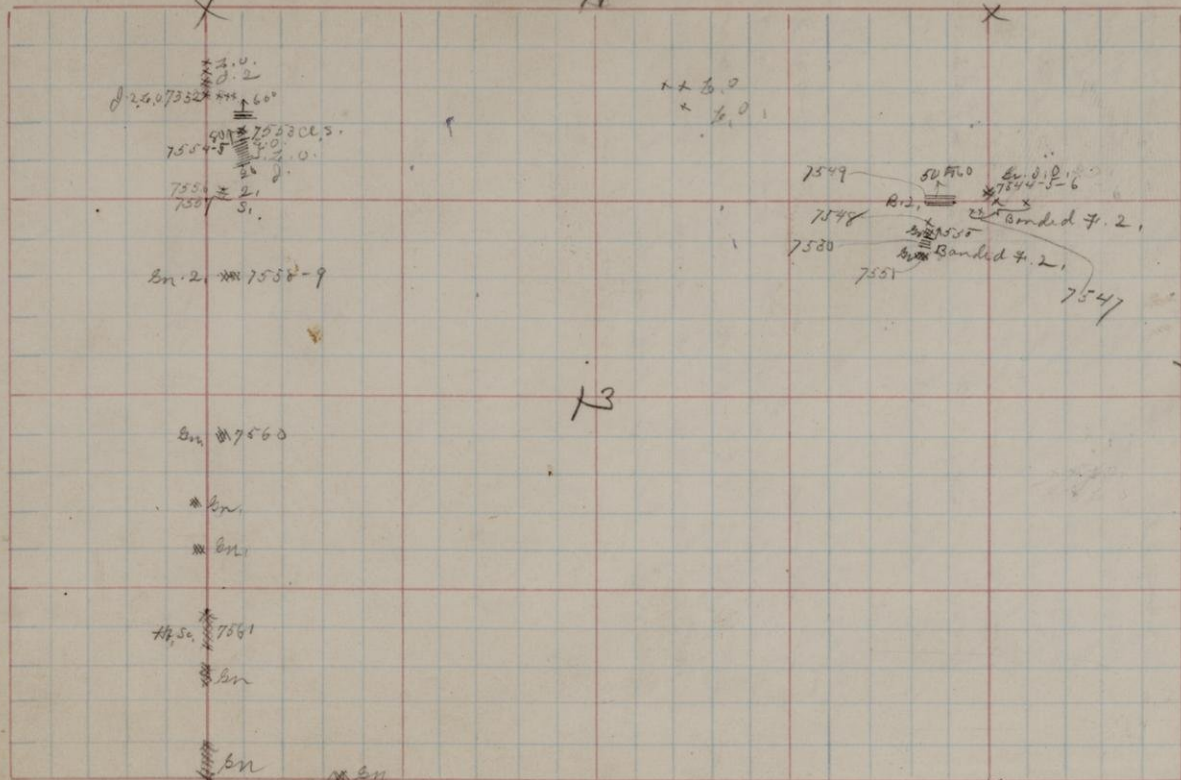
7543. Greenstone + Jasper inter-
mixed. From the above
knob. The fragments of jas-
per and jasperite are all at
times much larger than
shown in the specimen
being six to nine inches
in diameter.

The Black River was follow-
ed down stream to 1800 ft.
of 1/4 mile between Secs. 12 & 13
T4 R46, but no exposures
were found beyond the green
stone last mentioned.

Sec. 13

T. 47

R. 46



Friday, Aug. 1, 1884,
 7544 Greenstone, as it outcrops on
 bank of creek 4805. of N. 2.
 corner of Sec. 13. T. 47, R. 46.
 Drifting into the south
 bank (creek here runs nearly
 east and west) Jasper iron
 and jaspery quartz - are
 found.

7545- Peculiar phases of greenstone
 as it nears the above iron
 rocks, carrying jaspery ore
 and jasper, which it
 must have caught when
 erupted through these rocks.

7546 Different phases of jasper,
 jaspery quartz and jaspery
 iron ore from the above
 drift when it passes through
 the greenstone.

7547 Test pit 525 S. 25 W of N. 2.
 corner of Sec. 13 T. 47, R. 46. Con-
 taining materials like 7546,
 with the addition of a con-
 tact banded greenish sand-
 stone (7547).

Banded

7548 Ferruginous Quartzite. From

test pit 500 S. 150 W. of the
N.E. corner of Sec. 13, T. 47, R. 46.
Strike W. 150 S. dip 80° N.

Test pits containing Jasper and
lean ore 525 S. 80 W., 500 S.
20 E., and 500 S. 100 E. of N.E. cor-
ner of Sec. 13, T. 47, R. 46.

Black Banded

7549, Ferruginous quartzite. Outcrop
in bed of creek continuous from
500 S. 90 W. to 500 S. 165 W. of N.E.
corner of Sec. 13, T. 47, R. 46.
Strike E + W. dip 50° to 60° N.
Stream here runs E + W.

Greenstone (in bed of creek and
along bank) like 7544, 570 S.
165 W. of N.E. corner of Sec. 13.

7550 Ferruginous quartzite (like
7548-9) and quartzite iron
ore (7500) outcrop on bank of
creek from 580 S. 165 W. to
615 S. 175 W. Strike E. 15° S.
dip 55° N. The lean ore is
but more ferruginous phases
of the quartzite which ^{and gives iron} overlies
and underlies the ^{and gives iron} after fer-
ruginous belts which have been
unmined for iron ore.

7551. Greenstone (cut by calcite veins) Exposed in bed of creek and on bank 6255, 175 W. of the N.E. corner of sec. 13. T. 47, R. 46.

Strike and dips for the day given upon the supposition that there is no magnetic attraction, sun not shining

7552 Saturday, Aug. 2, 1884,
 Jasperly gray and lean ore
 prevailing varieties from test
 pits 2255. of the N. W. corner
 of Sec. 13, T47, R46.

From the above points test
 pits and trenches make a con-
 tinuous exposure of the same
 materials mixed with a little
 quartzite and some rich soft
 ore to 40 ft. of 7552.

There are also test pits show-
 ing materials at the following
 points, distances being given
 from position of 7552
 62 N., 90 N., 80 E., 60 E., and
 74 E. Also 955. 1002.

Outcrop of lean ore on north
 side of hill. 280 S. 100 E.
 of the N. W. corner of Sec. 13, T47
 R46, strike E. & N. dip 60° to 65° N.

7553 Peculiar chloritic sandstone
 exposed in test trenches at 3255.
 1008. of the N. W. corner of Sec. 13,
 T47, R46, and from this point
 ten steps continuously to the
 south. Lean ore is exposed in

in this trench, both north and south of it. The change from the sandstone to lean or is quite abrupt.

7554. Typical Lean Cr. From continuous test trench extending from 320S. 100E. to 420S. 100E. of the N. W. corner of Sec. 13 T. 47 R. 46. In places for two or three feet the ore is rich. Strike W. 20S. dip 80° N.

7555. Quartzite. Interbedded with the above ore in trench in two belts, each about ten feet in thickness.

7556. A test trench 470S. 60E. Jaspery quartz is found south of the lean ore.

7557. Compact Sandstone. From test trench 490S. 30E. of the N. W. corner of Sec. 13 T. 47 R. 46.

7558. Gneiss. Bare northern exposure. 700S. 75E. of the N. W. corner of Sec. 13 T. 47 R. 46. Exposure extends 60 degrees east and west.

7559 cherty-Quartzite. Bell two
or three feet wide cutting
(mining) ~~the above ground in a post~~
~~and near direction~~. 10 feet high
on face of ledge.

7560 Smeiss. Northern 4 p.m. 100 S. 40 E. of $\frac{1}{4}$ post between
Secs. 13 + 14. T. 47, R. 46.

Smeiss also at following points
280 S. 80 W. and 400 S. 20 W.
of $\frac{1}{4}$ post between Secs 13 + 14.

7561 Hornblende Schist. Large
northern 4 p.m. 550 S. of $\frac{1}{4}$
post between Secs. 13 + 14.
South side 650 S.

Smeiss was also observed
at the following points.
Bare Eastern 4 p.m. 4-
tending from 800 S. to 850 S. 15 W.
of $\frac{1}{4}$ post between Secs. 13 + 14.
Bare Eastern 4 p.m. 75
feet high extending from 900 S.
of $\frac{1}{4}$ post between Secs 13 + 14.
to S. W. corner of Sec. 13, face
of bluff being a few paces west
of line. and also at
340 E. of the S. W. corner of
Sec. 13. all in T. 47, R. 46.

Sec. 19

T. 47

R. 45

* 7543 Kb, Sc.

* 7562 Km, Sc.

19

7562. Mica Schist. Northern
 exposure 675 S. 675 E. of the
 N. W. corner of Sec. 19. T47
 R. 45.

7563. Mica Schist. Western ex-
 posure 575 E. of the N. W.
 corner of Sec. 19. T47 R. 45.

Test pits, containing con-
 crete at 195 S. 175 E., 195 S.
 225 E., and 245 S. 225 E.
 1/4 mile between Secs 12 & 13
 T47 R. 46.

The bed of Black River was
 followed across Sec. 13. T47 R
 46. but no outcrops were
 found.

Sec. 10 + 15 T. 47

R. 46

10

0.2.9.8

+ C

{
7570012 7569
7565 7564
7567 7566
7568

15

✓ Sunday, Aug. 3, 1884.
 7564. Rich ore. Typical variety at
 test pit 550 S. 175 W. of 1/4 corner
 between Secs. 10 & 15. T47 R. 46.

7565. Quartzite (containing numer-
 ous shots of ore) from test
 pit 550 S. 185 W. of 1/4 corner
 between Secs 10 & 15 - T47 R. 46.
 This specimen is fairly typi-
 cal of the quartzite, although
 the shots of ore are often
 very much larger. Frequently
 too the ore almost excludes
 the quartzite, and on frequent
 ly the quartzite excludes the
 ore in quite large pieces.
 The ore from this pit is
 like 7564.

Quartzite, like 7565, exposed
 in the trench 255. of it.

Quartzite, like 7565, and rich
 ore like 7564 from test pit
 355. of 7565.

7566. Soft lean banded ore, from
 test pit 135 S. of 7565.

7567. Jaspery quartzite and lean ore

Sec. 11

T. 47

R. 46

7572 *melophaga*

from test pit 150 S. of 7563,

Test pit with ore like 7566, 184 S.
of 7563.

Test pit with ore and quartzite
like 7564-5, 34 W. 40 S. of
latter.

7568. Purple Sandstone. From test
trench which carries ore
like 7564 and quartzite like
7565, 10 S. of latter.

7569. Purple Banded Ferruginous
sandstone. From test pit
70 N. 80 W. of 7563.

7570. Sandy Quartzite like 7565. From
test 60 N. 80 W. of 7563. Pit
also carries material like 7564-5.

7571. Peculiar phase of rock and lean
ore from test pit 50 N. 80 W.
of 7563.

Sec. 14 + 15 T. 47

R. 46

10

X

B. 7. 55. ⁷⁰
B. 7. 55. 7573

C. 7. 55. 7574

A. 7. 55. 7575

B. 7. 55. ⁷⁰
B. 7. 55. 7576

* B. 7. 55.

14

15

* B. 7. 55.

X

Monday, Aug 4, 1884.

7572. Greenstone (northern trap)
High bluff, estimated to be
200 feet high. Middle of west-
ern face 835 N. 20 E. $\frac{1}{4}$ pt.
between Secs. 10 & 11 T 47 R 46.

ponded

7573 Ferruginous quartz schist.
Northern exposure 340 S. 40 E.
of the N.W. corner of Sec. 14
T 47 R 46. Strike 2 + W. dip 70° N.
Same rock 736 S. of corner.

7574 Vitreous quartzite. Northern
exposure 60 S. 25 E. of the
N.W. corner of Sec. 14. T 47 R 46.

7575 Micaceous quartz-schist.
Northern exposure 73 S. 10 W.
of the N.W. corner of Sec. 14. T 47 R 46.

7576 Gneiss - two phases of - north-
ern exposure of bluff, the
N.W. corner being 860 S. 25 E.
of the N.W. corner of 14. T 47 R 46.

Gneiss 860 S. 50 W.

Gneiss 35 S. $\frac{1}{4}$ pt. between
Secs. 14 & 15. T 47 R 46.

Gneiss - continuous exposure
from 660 S. to 747 S. $\frac{1}{4}$ pt.

Sec. 22+23 T.

R. 46

X
Ln. 7577
S.

Ln.

7578 Ln.

Ln. 7579-7080

22

23

- 7577 Greenstone in coarse gneiss
755. of N.E. corner Sec. 22, 47. 46.
& probably continuous to 1505.
Gneiss from 5355. to 6105. of
N.E. corner of sec. 22, 77. 46.
7578. Fine grained gneiss, 9005.
of N.E. corner of sec. 22, 47. 46.
7579. Coarse and fine grained gneiss
502. of $\frac{1}{4}$ pass between sec.
22 & 23, 747. R 46.

7580 Greenstone dyke in 7579.

There is a gradual rise in
the ground from the N.W.
corner of 14 to where the
first outcrop 7573 occurs.
From this point there is con-
tinues constantly to 7576
the latter outcrop being 165 ft.
higher than the former.

Secs 84-9 T. 47 R. 46

SW 1/4 1582



7581 28.

8

6

X

- Tuesday Aug. 5, 1884
 7581. Greenstone (northern trip.)
 South side of east and west
 ridge 200 ft. $\frac{1}{4}$ post be-
 tween sec. 8 & 9. T47 R.46.
 At top of hill on line Barometer
 set at zero. At foot of hill
 on north side 500 ft. $\frac{1}{4}$ post
 Barometer read 100 feet.
 Few hundred paces farther
 north reading 130 feet.
7682. Greenstone. From the lowest
 point above there is a grad-
 ual rise to the N. 2. corner
 of Sec. 8, 47, 46. where the
 Barometer reads 80 feet.
 Here there is an abrupt
 fall to the north and at
 foot of hill from which
 7682 is taken the barometer
 gives 220 feet. 200 steps
 north of corner reading 230 feet.
 From this point the ground
 rises to the $\frac{1}{4}$ post be-
 tween sec. 4 & 5. 47. 46.
 where reading is 80 feet,
 and from this point run-
 ning northward there is
 first a gradual incline
 and for the last fourth

Sec.

4+5-
32+33

T.

47
48

R.

46
46

32

33

Amgg. # 7585

Br. # 7584

10 # 7583

5

4

X

mile a rapid one to 260
N. of the S.E. corner of Sec.
32. T 48. R. 46 where the
Barometer reads 440 feet.
From the point where 7582
was taken until the last men-
tioned point there are num-
erous exposures of greenstone
on the line and east and west
of it. At a few points spec-
imens were taken.

7583 Greenstone, Northern exposure
100 N. of $\frac{1}{4}$ post between Secs. 4 + 5
T 47. R. 46.

7584 Greenstone. From N.E. corner
of Sec. 4. T 47. R. 46.

7585 Greenstone. 260 N. of S.E. corner
of Sec. 32. T 48. R. 46. North-
ern exposure at foot of bluff
just south of Black River

7586 Ferruginous Sandstone. From
top of S. 800 W. of $\frac{1}{4}$ post
between Secs. 15 + 16. T 47. R. 46.

7587. Ferruginous Quartzite. Top
of 205. 800 W. of $\frac{1}{4}$ post
between Secs. 15 + 16. T 47. R. 46.

Secs 16 + 21 T. 47

R. 46

16

7592
7591
7590

7590 H. J.

7589 B. J. 2

7594 limestone

7583 L

21

7588. Quartzite, carrying bands
and cherts of lean ore. From
test pit 5 ft. 800 W. of $\frac{1}{4}$ post
between Secs. 15 & 16. 47. 46.
Some rocks at test pits
10 ft. 800 W. & 35 ft. 800 W.

(7589) Banded ferruginous quartzite
From test pit 45 ft. 800 W.
of $\frac{1}{4}$ post between Secs 15 & 16. 47. 46.
Some rock in pit 95 ft. 800 W.

Test pits 112 ft. 800 W. and 122 ft.
800 W. Carry materials like
7588. Test pit 140 ft. 800 W.
some rock, but richer in iron.

Test pits from which large dump
piles of rich soft ore have been
raised at 170 ft. 800 W. and
200 ft. 800 W.

7590. Ferruginous Jasper and Quartzite
from latter of above pits -

Is can banded ore in test pit
230 ft. 800 W. of $\frac{1}{4}$ post.

Rich soft ore in test pits at
following points, 413 W. 25 ft.,
476 W., and 528 W. of $\frac{1}{4}$ post

between Secs. 15 & 16. 47, 46.

7591 Ferruginous marlstone. From test pit 548 N. of $\frac{1}{4}$ post between Secs. 15 & 16. 47, 46.

7592 Ferruginous sandstone. From test pit 560 N. of $\frac{1}{4}$ post.

Rich ore from test pits at following point. 590 N. 50 S. of $\frac{1}{4}$ post between Secs. 15 & 16, 47 & 46, and 68 S. of center of Sec. 16.

7593 Granite. From western end of bluff 558 E. 700 N. of the $\frac{1}{4}$ post between Secs. 16 & 20. 47, 46.

7594 ^{very fine grained Siliceous} Vitreous marlstone. From test pit 575 E. 900 N. of $\frac{1}{4}$ post between Secs. 16 & 20. 47, 46.

All of the above specimens from 7586 are upon the brow or along the northern and western slope of a high ridge which runs nearly east and west from the $\frac{1}{4}$ post between Secs. 15 & 16 and terminates about $\frac{3}{4}$ mile west of that point.

Sec.

17

T.

47

R.

46

17

S. 7595

*7599 6.6.

+ 3.0.

2. 4.0 * 7596

* 7.2.
760 * 7.9.7598 * 7600 2.
3.0.~~XXXXXXXXXXXX~~ 7597 6.

X

Wed. Aug. 6, 1884.

7595. Compact Sandstone. From test pit 900 N. 435 W. of the S.E. corner of Sec. 17, 47.46.
7596. Quartzite. From test pit 700 E. 547 S. of $\frac{1}{4}$ post between Secs. 17+18. 547 P. 46. Test pit also contains lean ore.
7597. Granite. Southern exposure 500 E. of S.W. corner of 17 47.46. Running west from this point upon the line there is a continuous exposure to the S.W. corner of 17. The exposure continued both east and west of these extreme points but was not followed further.
7598. Lean ore. From test pit 700 S. 400 E. of $\frac{1}{4}$ post between Secs. 17+18. 547 P. 46. Strike W 50 S. dip 70 N.
7599. Peculiar lean ore. From test pit 400 S. 800 E. of $\frac{1}{4}$ post between Secs. 17+18. 47.46.
- Test pit with ore like 7598 400 S. 480 E. of $\frac{1}{4}$ post.

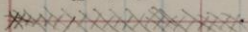
Secs 18+19 T. 47

R. 46

18

5×7606
 5×7605
 5×7604

2 + 0.



72 x 7604

2 x 7603

7602

5×7601
 5×7600

x 2.0.2

19

- 7600 Quartzite, carrying chert and
barite ore. From test pit
300 N. 150 E. of S. W. corner of
Sec. 17 T. 47, R. 46.
7601. Ferruginous Jasper. Northern
exposure 275 N. of the S. W.
corner of Sec. 17 T. 47, R. 46
- Ferruginous Quartzite, like
7600, Northern exposure 830 N.
of S. E. corner of Sec. 18. 47. 46.
- Granite, Southern exposure
348 S. of $\frac{1}{4}$ post between Secs.
18 & 19. T. 47, R. 46.
- Granite (like 7597) Continuous
Western exposure from 348 S. 175 N.
to 225 S. 150 W. of $\frac{1}{4}$ post between
Secs. 18 & 19. 47. 46.
- 7602 Micaceous Quartz-Schist. South-
ern exposure. 100 S. 150 W. of $\frac{1}{4}$ post
between Secs. 18 & 19. 47. 46.
dip 60° N. (estimated)
7603. Vitreous Quartzite. Test pit
100 E. 20 S. of $\frac{1}{4}$ post between
Secs. 18 & 19. 47. 46.

Sec. 57+18 T. 47

R. 46

7
10 7907

18

7604. Typical Quartzite, mingled with bands and chert of ore. Test pit 70 ft. of $\frac{1}{4}$ post between 18 + 19. 47.46. This is the typical rock in which all the rich ore is found in 747.46, and in which the great bulk of the test pits are sunk.

Quartzite (with ore) almost continuous exposure from 60 SE. of the S. W. corner of Sec. 18. to $\frac{1}{4}$ post between Secs. 18 + 19 47.46. Like 7604.

Continuous row of pits with lean ore and quartzite like 7604 from 70 ft. of $\frac{1}{4}$ post between Secs. 18 + 19 to 300 ft.

7605 Banded Sandstone. From test pit 150 ft. 50 ft. of $\frac{1}{4}$ post between Secs. 18 + 19. 47.46.

7606 Talcose Sandstone. From test pit 276 ft. 175 ft. of $\frac{1}{4}$ post between 18 + 19.

Bare Quartzite and ore, like 7604, exposed upon the north

side of an east and west bluff
from 1200 N. of $\frac{1}{4}$ post to 225 N.
300 W.

Test pit with rich copper
and typical quartzite 1902, 1905.
of N. W. corner of Sec. 19. 47. 46.

